MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019/2020

PBM0054 – MATHEMATICS

(Foundation in Business)

21 OCTOBER 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FOUR** questions.

2. Attempt **ALL** four questions. The distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

QUESTION 1

a. Simplify for:

i. $\left(\frac{3xy^3z}{2a^2bc^2}\right)^3 \times \left(\frac{16a^4b^3c^5}{15x^7yz^3}\right)$ (3 marks)

ii. $\sqrt{24} \times \sqrt{27} + \frac{9\sqrt{30}}{\sqrt{15}}$ (3 marks)

b. Solve for x in the equation:

$$\sqrt{3x+7} = \sqrt{x+6} + 1$$ (7 marks)

c. Find x for the equation:

$$x^{\frac{1}{3}} - 3x^{\frac{1}{6}} - 10 = 0$$ (5 marks)

d. Find an equation of the line that contains the point $(-4,5)$ and is perpendicular to the line $y = 2x + 1$. (2 marks)

e. Graph the region of the plane that satisfies:

$$\begin{cases} x \geq y \\ 2y > 1 \\ 2x + y - 3 > 0 \end{cases}$$ (5 marks)

(Total: 25 marks)

QUESTION 2

a. Solve the following equations:

i. $\frac{e^4}{e^{7x}} + 12 = 21$. (3 marks)

ii. $3^{2x} - 9 = 0$. (3 marks)

iii. $3\log_{10}(x) - \log_{10}(70x - 100) + 1 = \log_{10}(x)$. (6 marks)

b. Solve the following system of logarithmic equations using the inverse of coefficient matrix.

$$\begin{aligned} \log u - \log w &= -2 \\ \log v + \log w &= 5 \\ \log u + \log v - \log w &= 0 \end{aligned}$$ (13 marks)

[Hint to find u, v, w: Let $x = \log u$, $y = \log v$ and $z = \log w$]

(Total: 25 marks)

Continued...

QUESTION 3

a. Find the $\frac{dy}{dx}$ for the given functions and simplify the answers.

i. $y = 5\sqrt[3]{x^2} - 4x^{-\frac{1}{8}} + 6\left(x^3 - 5\right)^{\frac{3}{2}}$ (5 marks)

ii. $y = (3x+4)^2(2x^2 - 4x + 1)^3$ (6 marks)

b. Find the equation of the tangent line to the curve $y = \frac{\left(3x^4 - x^2\right)^2}{(2x+3)^2}$ at $x = 1$. (8 marks)

c. If $u = 4x^{\frac{3}{4}} - 5$ and $y = 2\sqrt[5]{u^2} - 5u^{\frac{1}{3}}$, find the $\frac{dy}{dx}$. (6 marks)

(Total: 25 marks)

QUESTION 4

a. Integrate each of the following integral.

i. $\int \left(\frac{1}{6}x^3 + 2x^{-2}\right)\left(x^{-\frac{1}{2}} - \frac{2}{3}\right) dx$ (5 marks)

ii. $\int \frac{8x^2 - 6}{\left(4x^3 - 9x + 7\right)^{10}}\, dx$ (5 marks)

iii. $\int_{-2}^{0} \left(x^2 - 3\right)\, dx + \int_{0}^{2} 6x^2\, \sqrt[3]{8 - x^3}\, dx$ (8 marks)

b. The marginal cost function of producing x units of a product is given by

$$MC = \frac{3x^3}{\sqrt{1+x^4}} + 2 .$$

Find the total cost function $C(x)$, if the fixed cost is RM1000. (7 marks)

(Total: 25 marks)

End of Paper